Industrial Computing

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Industrial Computers

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For detailed product specifications see Moxa's Industrial Computing product catalog, or visit our corporate website at www.moxa.com/industrialcomputing.htm.

Rugged Computers

Harsh Environments

Fanless Design for Wide Operating Temperatures

Creating a fanless design presents many challenges for developers of wide temperature products. Not only do the components need to meet wide temperature requirements, but the hardware layout design that integrates all peripheral computers must fulfill wide temperature demands as well.

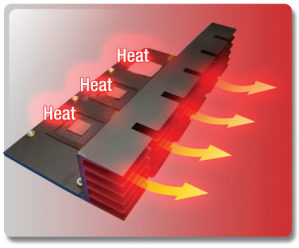
One of the major challenges faced by IPC manufacturers is to provide a fanless computer that meets industrial standards and works well in wide temperatures and harsh environments. Moxa's design philosophy emphasizes compact and elegant architectures that do not use fans. A fanless design reduces size, complexity, susceptibility to dust, and wear and tear. Instead of taking shortcuts by using problematic components, Moxa selects components that generate less heat but can still maintain high system performance. The result is a more stable, reliable, and cost effective system that dramatically reduces total cost of ownership.

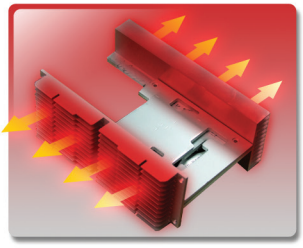
Moxa's Industrial-grade Design	Conventional Design
-40 to 75°C operating temp.	-10 to 60°C or -40 to 75°C storage temp.
40-hour uninterrupted burn-in	N/A
Rigorous chamber testing: Forced-convection and natural-convection thermal chambers simulate real-world conditions	Standard chamber testing: Forced-convection thermal chamber
BIOS Dynamic Throttling Technology	N/A

VS

Patented Heat Dissipation Design

Traditional externally-attached heat sinks can only go so far. For even more robust heat dissipation, Moxa has patented an innovative "L and H-type" heat sink that makes direct contact with the major inner heat sources to cool down a device's internal temperature.

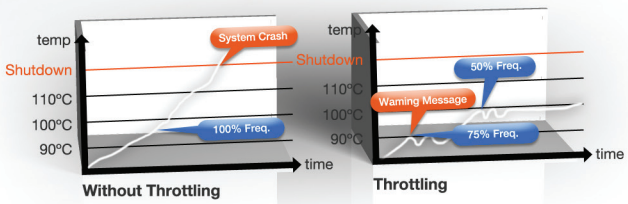




BIOS Dynamic Throttling Technology

BIOS throttling efficiently cools down the system, but also lowers system performance. Moxa's dynamic throttling technology optimizes throttling behavior for maximum reliable performance.

Special Heat Dissipation Design



Rigorous Thermal Performance Testing

Design is only half of the thermal picture: the device ultimately must also be tested in order to verify its performance. However, not all tests are equal: test parameters and conditions directly effect how accurately the test simulates real world conditions. There are two types of test chambers used by industrial computing providers:

Forced Convection Chamber (FCC)

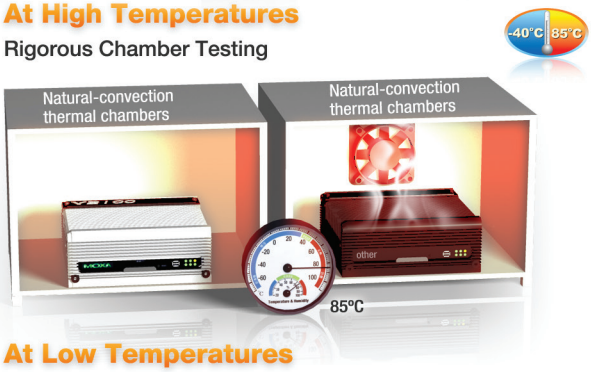
This type of chamber, which uses slow airflow to heat the chamber, produces less reliable results since it poorly simulates the actual environmental conditions of industrial applications.

Natural Convection Chamber (NCC)

This type of chamber, which simulates a windless environment, more closely resembles actual industrial application settings. Results from these tests are more reliable because the static airflow is a closer simulation of real-life industrial environments.

At High Temperatures

Rigorous Chamber Testing

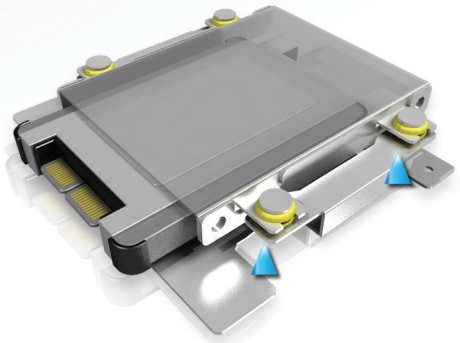


At Low Temperatures

Rigorous Chamber Testing

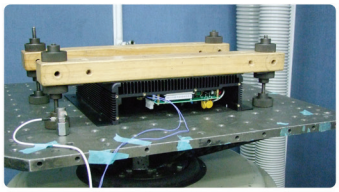
Anti-vibration and Anti-shock

Protecting and safeguarding data is vital for all storage devices, particularly those deployed in harsh environments such as moving vehicles where vibration and shock are frequent and unpredictable.



Safeguarding a data acquisition system's storage devices, such as CFs, SDs, and Flash memories, from the effects of excessive motion and detachment is extremely important. Many of Moxa's industrial-grade systems are backed by 5G anti-vibration and 50G anti-shock guarantees, making them ideal for rolling stock and other mobile applications.

It is important to realize that there can be a big difference between the protection provided by products from different companies. With Moxa's unique and innovative bracket design, and our knowledge of which materials to select, we are able to provide a range of anti-vibration and anti-shock grades to ensure compliance with maritime testing standards. Our anti-vibration and anti-shock technology reduces data loss to a minimum and provides a safe and sound storage environment for deployment in transportation vehicles and other highly mobile applications.

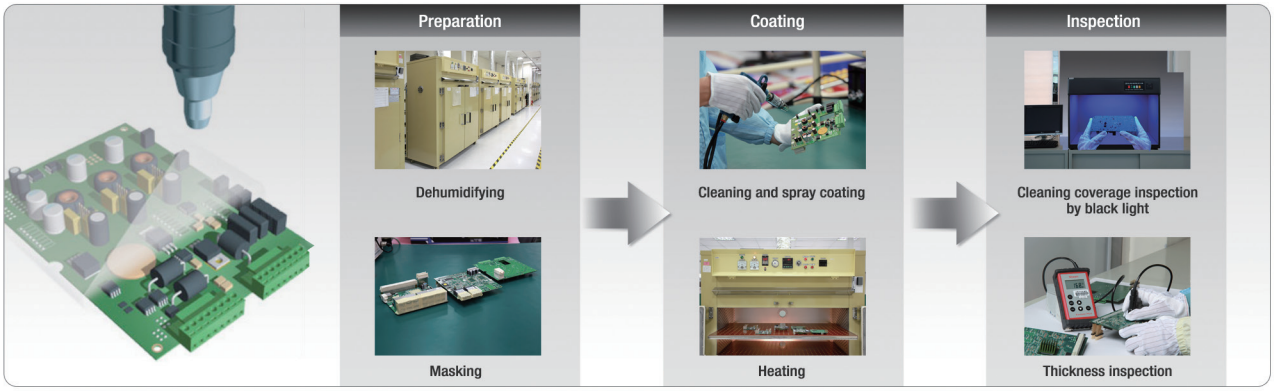


Conformal Coating

Protective conformal coating on PCBs and other electronic circuitry isolates components from the effects of moisture, dust, corrosion, vibration, and shock, all of which are present in harsh maritime environments. Moxa's conformal coating method ensures a reliable and rugged system by reducing the effects of mechanical stress and vibration on the circuitry, and also improves the circuitry's ability to resist extreme temperatures, vibration, and chemical vapors.

Reasons to Choose Moxa for Conformal Coating

- Our products use Dow Corning 1-2577 silicon resin coating, which forms a firm, abrasion-resistant surface after curing
- All products with conformal coating are tested and inspected in accordance with the strict IPC-A-610D 10.5.2.2 Class 1/2/3 standard under black light
- Conforms to IPC-CC-830 SR type thickness requirements (50 to 210 μm)
- Additional full-function testing and quality assurance prior to shipment



Industrial-proven Certification

DNV/IEC 60945/IACS-E10 Certified and ECDIS Compliant

DNV 2.4, IEC 60945, and IACS-E10 directive certifications attest that Moxa's marine computers operate reliably in marine applications, and help create a solid computing infrastructure for various navigation, radar, and conning tasks. Marine computers are also used is in the control room to process applications such as the positioning system and automation control system.

The ECDIS (Electronic Chart Display & Information System) delivers precise positioning information and intuitive route and navigation planning functions to improve the safety and efficiency of seagoing vessels. Moxa's ECDIS compliant computers help mariners handle a variety of navigation-related tasks, and ECDIS digital charts, displays, and data make marine navigation easy and reliable.

IEC 61850-3/IEEE 1613 Certified and IEEE 1588 Compliant

The IEC 61850-3 and IEEE 1613 standards define the strictest requirements for EMI immunity and error free communications for equipment used in substations. Due to the nature of substation environments, it is imperative that all hardware used in the system be highly functional and reliable. Embedded computers must perform consistently, for both front-end computing and backbone hosting. As a leading manufacturer of industrial-grade embedded computers, Moxa has a vast selection of IEC 61850-3 certified computers and products.

IEEE 1588 v2 compliant precision time protocol and clock synchronization ensure precise time accuracy for event loggers in power substation systems.

EN 50155 and e Mark Certified

The EN 50155 standard governs the operation, design, construction, and testing of electronic equipment used on rail vehicles and in railway applications. Moxa's railway computers are EN 50155 certified and undergo environmental testing to ensure reliable performance under a variety of power supply conditions, such as voltage variations, power interruption, and supply changeover. The computers can also withstand environmental disturbances, including vibration, shock, and extreme temperature.

A product that displays the e-mark ensures that automobile and motorcycle products sold by manufacturers and operated by users conform to basic safety and environmental standards. Moxa's e Mark certified products covered by regulatory controls are tested and ertified which are ideal for vehicular applications.

EN 50155 EN 50121 eMark

Quality Control

Longer MTBF and low RMA rate

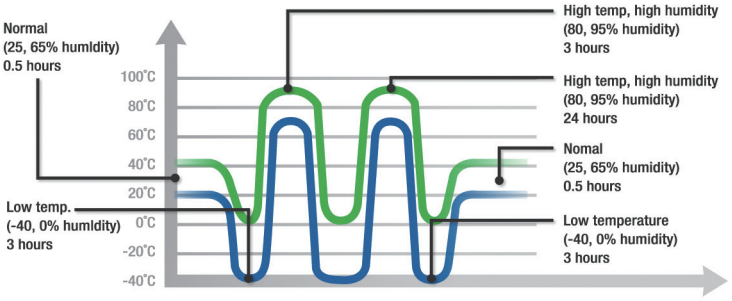
Moxa's embedded computers undergo a 40-hour burn-in chamber test and offer a longer MTBF. This translates to fewer parts to replace and lower overall cost for industrial systems. In addition, the low RMA rate (under 1.5%) guarantees that the applications can operate with low maintenance effort.

3 or 5-year warranty

Moxa's embedded computers are backed by a solid 3 or 5-year warranty, which is longer than other IPC providers who only offer a 2-year warranty. The longer warranties reflect our confidence in the reliability of our products, even when used for demanding industrial applications.

MTBF of Embedded Products

Product Name	UC-7112 Series	W406 Series	IA260 Series	V2406 Series	MC-5150 Series
Platform	RISC	RISC	RISC	x86	x86
Operating Temp.	0 to 60°C	0 to 60°C	-40 to 75°C	-40 to 70°C	-15 to 55°C
Failure Rate	6.717319	5.878760	6.880977	3.62	4.54
MTBF (hrs)	148980 (13.9 years)	170162 (19.4 years)	145328 (16.6 years)	276294 (31.5 years)	220490 (25.1 years)



Moxa (industrial-grade)	Other Brands (conventional)
Fan and cable-free	Fans and cables often used
5-year warranty (RISC) 3-year warranty (x86)	2-year warranty (extended warranty costs extra)
RMA Rate: under 1.5%	RMA Rate: over 2%
Longer MTBF: x86 wide temp. > 8 years RISC wide temp. > 13 years	Longer MTBF: N/A
Special Certifications: DNV, IEC 61850-30, EN 50155, e/E Mark	Special Certifications: N/A

VS

Ready-to-Run Rcore Software Platform

Take advantage of Moxa's Rcore platform to increase your competitiveness and ensure a faster time-to-market. The Rcore platform provides the following hard-to-beat benefits:

- Easy-to-use application libraries
- Proven and bug-free sample code
- Consulting-level advice for application development
- Fast concept validation and development cycle

BIOS and Boot Loader

Moxa provides full-featured BIOS and boot loader solutions for both x86-based and RISC-based systems. The wide range of options and extensions provide an answer to any potential need. Key features include:

BIOS

- Power failure recovery
- LVDS innovation: various resolutions supported (up to 64 options)
- Dynamic throttling technology
- Remote system wake-up
- Remote LAN boot
- Wide compatibility with peripheral devices
- Secure software protocols
- Fast boot
- BIOS code customization and consulting
- Secured pen drive boot

Boot Loader

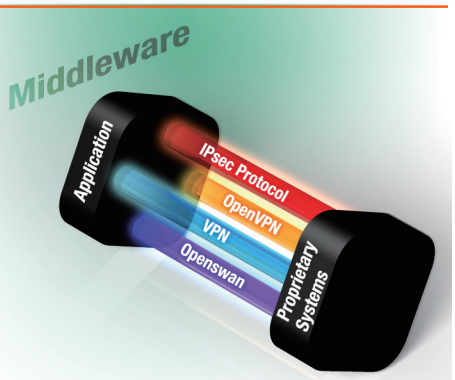
- External disk boot option
- MDM remote management tool to remotely update firmware or for system recovery
- Fast boot
- Boot loader customization and consulting

Operating Systems

Moxa's x86 and RISC-based embedded computers offer a powerful computing environment and stable system for a variety of industrial applications. These computers use either a Linux or Windows (CE and XPe) embedded operating system to provide programmers around the world with a user-friendly environment for application development, and help reduce the effort required for system integration. Moxa is continually on the lookout for real-time operating systems that are suitable for mission critical applications.

Middleware

Moxa offers a variety of middleware to help you easily integrate these application modules into your system. This is essential for leveraging the key features of these modules and reducing the effort required for application development.



VPN

The VPN (OpenVPN, L2TP, and IPSec) middleware makes it easy for user applications to create secure tunnels between communication parties.

Firewall

The firewall (iptable) middleware protects enterprise information from un-friendly access.

Database

The database system (MySQL and MSSQL) middleware can be used to manage eld-data acquisition, with web services (Web, PHP, ASP) included to give programmers an integration framework for building Internet accessible eld applications, such as WebSCADA.

VPN Middleware

Unbeatable middleware for integrating application modules into proprietary systems

Virtual Private Network (VPN)

A Virtual Private Network (VPN) allows the provisioning of private network services for an organization or organizations over a public infrastructure, such as the Internet, instead of with physical wires. The network is said to be "virtual" because it links two "physical" networks (local area networks) using an unreliable connection (the Internet), and "private" because only computers that belong to a local area network on either end of the VPN can "see" the data. The technologies introduced today are applied to IP-based VPNs rather than frame relay or ATM networks.

IPsec Protocol

Internet Protocol Security (IPsec) is a suite of protocols for securing Internet Protocol (IP) communications by authenticating and/or encrypting each IP packet in a data stream. IPsec protocols provide a set of security services to create secure channels between a pair of security gateways, such as a router or a rewall. Since IPsec provides reliable encryption, integrity, authentication, and replay protection, adding IPsec to Moxa's embedded computers helps prevent threats from intruders.

OpenVPN

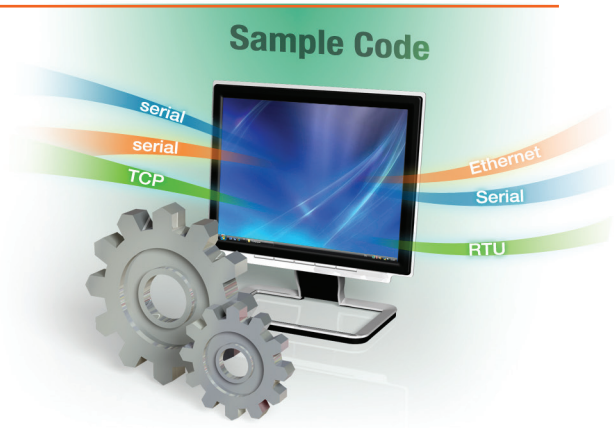
OpenVPN is one of the virtual private network (VPN) solutions that establish secure tunnels between host computers. Two networking techniques are supported by OpenVPN: Ethernet bridging and IP routing. Moxa provides a ready-to-run OpenVPN middleware to enable Moxa embedded computers to be used as OpenVPN gateways with IP routing capability.

Openswan

Openswan is an implementation of Internet Protocol Security (IPsec) for Linux platforms. Moxa provides Openswan conguration examples for integrators who want to use RSA (Asymmetric key cryptography) and PSK (Symmetric key cryptography) authentication algorithms to create host-to-host, subnet-to-subnet, or host-to-subnet IPsec connections.

Sample Code

To lower customers' development cost, Moxa provides sample code for a wide range of embedded applications, such as serial-to-Ethernet (S2E), serial-to-serial (S2S), and Modbus TCP and RTU. This high-level sample code or application libraries hide the details of implementing complex data communication by presenting relatively simple function prototypes for user applications. In addition, low-level libraries that manage direct access to peripheral I/O devices, such as LCM, key pad, digital IO signals, and watchdog functions, are also included. With ready access to such a rich assortment of embedded applications, programmers obtain much greater flexibility than would otherwise be possible. These libraries help programmers quickly grasp the full functionality of their applications, and in this way gain the condence needed to complete their project, speeding up product development and ensuring that code is efficient and bug-free.



Sample Code Makes Software Development a Piece of Cake!

In addition to being part of the Linux community, the Moxa embedded computer family also includes models running the Microsoft® Windows® Embedded operating system. Adopting a widely used programming environment makes our embedded computers suitable for software development and legacy system migration.

LCM

The LCM Programming function helps developers easily program LCM displays on the UC-7410/7420 and DA-660 series computers.

Keypad

The Keypad Programming function helps developers easily program keypad buttons on the UC-7410/7420 and DA-660 series computers. In addition to the primary function, additional API functions are provided, such as a callback function defined by programmers to associate with an event.

Socket

Moxa embedded computers come with network interfaces that allow client-server applications to communicate with each other across a computer network. A Socket Programming function helps developers implement socket programming with TCP or UDP protocols.

Serial

In addition to the primary Serial Port Programming function, Moxa embedded computers offer higher level APIs for serial connections.

Real Time Clock

Developers can use the RTC Programming function to get the current time, set the hardware clock time to a specific time, set the hardware clock time to the system time, or set the system time from the hardware clock, by using the function sample codes.

Buzzer

A Buzzer Programming function allows developers to trigger alarm beeps for unusual events.

Watchdog Timer

Moxa's embedded computers are also equipped with a Watchdog Timer Programming function that sets the system back to normal if applications don't acknowledge.

Download

To download Sample Code, visit the following link:

http://rcorecommunity.moxa.com/samplecodedownload

Tool

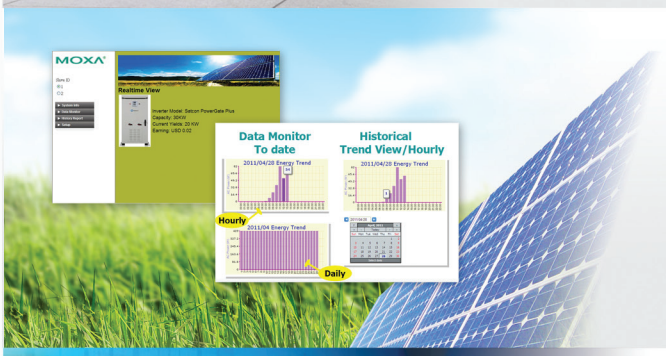
Moxa provides a Windows PC-based tool (MDM) that autodetects, congures, and manages Moxa's embedded computers over an Internet environment. This tool provides features for setting IP addresses, managing files, monitoring memory usage of computers, and helping application developers deploy their programs en masse to an entire army of computers.

AP

Moxa's AP provides a flexible and customizable interface that can be easily implemented into a user's existing platform. The AP includes: (1) MIRF, an innovative platform for the rolling stock industry that allows users to easily configure their system with the most ideal and optimal settings, (2) Web Enabler, which offers an easy-to-use method for solar inverters to get online for remote monitoring, and (3) SSD Health Monitor, which enables users to easily monitor and detect the SSD status.

MIRF

MIRF (Moxa Intelligent Routing Framework) is an innovative solution for wireless railway passenger network applications. In order to provide commercial-grade multimedia service, system integrators need to develop more value-added software. Unfortunately, open programmable platforms for development may not be readily available.



Get your inverter online with Moxa's Solar Power Inverter Web Enabler

Moxa's Web Enabler makes it easy to get your solar power inverter online, and provides the following advantages:

- Both remote and real time views
- Periodically queries inverter energy values of different types
- Supports extended storage of energy values by overwriting the oldest values

SSD Health Monitor

Moxa's SSD Health Monitor is a software tool that helps users detect and monitor the health status of SSDs and hard disk drives. The tool makes it is easy to complete the following tasks:

- Instantly monitor SSD health status
- Detect bad sectors on the SSD
- Prevent the SSD from crashing and other risks

Customization Service

Overview

Professional Design Service (PDS)

Moxa's customization service for industrial computing products is based on the Professional Design Service (PDS) concept, which aims to provide customers with tailor-made solutions. Industrial applications often have specific requirements, and specialized solutions are often needed. With 25 years of experience in the industrial networking and automation field, Moxa can offer professional, customized products and services that are ideal for your own industrial applications.

Customer Benefits

- Local single-point contact and exclusive key account service
- Accelerated time-to-market with Moxa's team of experienced engineers
- Global RMA and logistic support
- Quality solutions to meet corporate standards
- Customized and versatile systems to ensure customer satisfaction
- Cost reduction through Taiwan-based purchasing channels
- Reduce engineering costs with Moxa's extended industry experience
- Reduce investment on production assets and quality assurance system
- Enhanced efficiency through Moxa's global business presence

Core Technologies

Comprehensive Connectivity Solutions

- Versatile serial communication technology
- Ethernet ports, including LAN port, switch port
- Industrial-grade interface: CANBus, DI/DO, AI/AO
- Wireless technology: GSM, GPRS, EDGE, 802.11a/b/g
- Display functions: VGA, LVDS

Ready-to-run Rcore Software Value

- Custom programming libraries
- MIRF-Multi-Interface routing frame work
- Management software available

System-wide Thermal Technology

- High performance with fanless design
- -40 to 85°C wide-temperature design
- BIOS dynamic throttling technology

Industry Expertise

- DNV/IEC 60945/IACS-E10 certified and ECDIS compliant for marine applications
- IEC 61850-3/IEEE 1613 certified and IEEE 1588 compliant for power applications
- EN 50155/e Mark certified for railcar and railway applications

Highly Scalable

- Modular design
- Built-in HD slots for storage expansion
- Compact form factor design

Precise Conformal Coating

- Complete process to reduce the effects of mechanical stress and vibration on the circuitry
- Conforms to IPC-CC-830 SR type thickness requirements (50 to 210 µm)
- Additional full-function testing and quality assurance prior to shipment

Moxa creates "mutual value" by working closely with customers to meet their exact specifications!

Why Choose Moxa?

Processes and Quality Control

Moxa offers quality product designs for both hardware and software. As a professional industrial networking and computing automation solution provider, Moxa offers industrial-grade products that meet even the most severe industrial requirements. For example, fanless products need a sophisticated thermal design to dissipate heat from the inside of the products, and some products are even required to meet specific industrial certifications, such as EN 50155 for rolling stock applications, IEC 61850-3 and IEEE 1588 for power automation applications, and DNV for the marine industry. To meet these harsh requirements, Moxa's engineers are dedicated to providing high quality products that ensure reliable operation when used as part of a variety of industrial applications. Moxa also aims to provide a flexible software platform that allows users to implement their own programs for specific applications, quickly and easily. This is particularly useful when you want to build applications that use existing software and platforms, such as APIs, sample code, libraries, and network services. With Moxa's help, you can expect to get your customization projects off the ground quickly, with minimal effort and cost. In addition, Moxa has implemented a sophisticated customization service SOP, that applies to both CVF (Customized Version with Full-scale Change) and CVS (Customized Version with Small-scale Change) projects.

Full-scale Change

Full-scale change projects require an entirely new hardware design and/or new software functions. Moxa is able to accept projects for a wide range of applications, including those that require rugged, industrial-grade solutions.

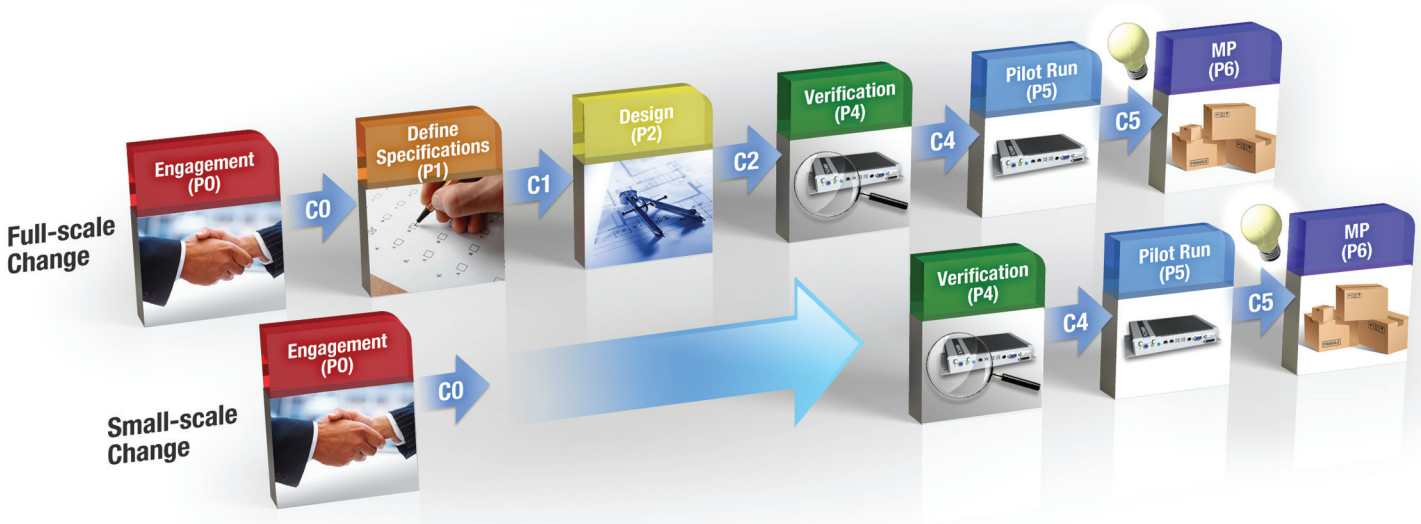
Small-scale Change

Small-scale change projects only need minor changes to hardware and/or software. For example, you may want the products to display your own company's logo, or need new interfaces for different device connections. Moxa can also provide project management and consulting services to help you with your own industrial applications.

In order to provide dedicated and customer-centric customization service,we follow a well-defined process for each project. The process guarantees that your requirements will be carefully considered so that we can provide reliable, tailor-made products.

1 Discuss requirements
2 Proposal from Moxa
3 Sign contract
4 Deliver samples 75 working days
5 Customer approval 10 weeks
6 Deliver products 8 weeks

Customization Service Timeline



Multi-faceted Approach to Design

Compared to more traditional design approaches, Moxa's approach is based on platform and system instead of components. Traditional designs usually aim to provide products that emphasize hardware specifications, such as CPU, memory capacity, and numbers of communication interfaces. On the contrary, Moxa's "total platform and total system" designs result in ideal solutions that fit customers' industrial application requirements, and make it possible for customers to quickly set up their applications with the most well-suited products. In addition, Moxa's 25 years of experience in the industrial automation industry makes it easy for us to offer customers suitable products and solutions.

Management Capability

Moxa's KA (Key Account) strategy is to use an SME (Sales Management Excellence) system to establish mutual and reliable relationships with key customers. This system offers great service and support by providing the most ideal products and creating added value for key customers. In addition, after-sales service is one of Moxa's strengths, and our 3 or 5-year warranty ensures the longevity of our products. Moxa also has a broad knowledge of vertical markets, and is always eager to share this knowledge with our key customers.

Integrated Solution

Choosing Moxa means choosing the most experienced solution provider in the industrial automation market.Moxa can integrate a variety of industrial requirements for networking, computing, and data acquisition into a single platform and system for industrial automation. Both hardware and software requirements can be easily integrated to provide ideal solutions that fit customers' industrial application requirements, and make it possible for customers to quickly set up their applications with the most well-suited products. In addition, Moxa's 25 years of experience in the industrial automation industry makes it easy for us to offer customers suitable products and solutions, and our strong after-sales service and 3 or 5-year warranty ensures the longevity of our products. Moxa's engineers have a broad knowledge of vertical markets, and are always eager to share this knowledge with our key customers. In addition, the software add-on value that Moxa brings offers customers a ready-to-run platform for system integration.

Moxa Customization Service Case Studies

Small Scale

Product Model

V2406-XPE (TM) Computer

New Features

- Modified from the standard V2406 computer
- 2 hard disks for added storage capacity
- Dual independent displays (VGA + DVI-I)
- Dual LAN ports with M12 connectors
- Multiple digital input/output channels
- Multiple USB hosts for external storage or devices
- EN 50155 certified

Application

NVR application for cars in a Taipei Metro System train

Background

This product is based on the MC-4510-C23 computer and has been customized for the live view and playback functions required by NVR applications. The new design includes a power input and LAN ports that use M12 connectors, and a patented hard disk drive kit that supports two removable commercial hard disks to meet EN 50155 and EN 50121 standards for rolling stock and railway applications.

Full Scale

Product Model

EBC-2101-T Communication Module

New Features

- New hardware design
- New main board with V2101 CPU board
- Wireless module
- 1 LAN port with M12 connector
- Multiple LAN ports for network redundancy
- Multiple digital input/output channels
- Easy integration with existing systems

Application

Communication computer for railway digital cellular repeater system

Background

This product is based on the V2101 CPU board, has been designed to fit the user's blade board in a 19-inch rackmount chassis. It has screw-type M12 connectors for both LAN and switch ports, and built-in GPS and cellular communication modules.

Software Customization

Product Model

Windows FTU Tool and FTU Gateway Establishment with EM-1240 CPU Board

New Features

- Linux 2.6 ported
- Implements FTU Gateway
- Implements Windows FTU Tool

Application

Power Distribution

Background

This software customization project combined the Linux 2.6 platform with the EM-1240 CPU board. The combination of network setup function from the Moxa Device Manager (MDM) tool and FTU Gateway and Windows FTU Tool completely fulfilled the customer's requirements for power distribution applications.

x86-based Wallmount Embedded Computers

x86-based Processor Offer Powerful Performance

Moxa's V Series computers feature either Intel or AMD processors, offering powerful performance for sophisticated industrial applications, such as data acquisition, data computing, and protocol conversion.

Display Output for Field Site Monitoring

All V series computers are equipped with a VGA output, providing an ideal solution for applications that involve field site monitoring. Some models even come with an LVDS output to provide greater display connection flexibility.

Multiple Communication Interfaces

All V series computers feature a variety of communication interfaces, such as serial ports, DI/DO channels, LAN ports, switch ports, PCMCIA slots, USB hosts, and CompactFlash sockets. This wide range of interface options make Moxa's V series computers perfect solutions for industrial automation, such as in factory automation, production lines, and even mining facilities.

Model Name	Serial Ports		LAN Ports		Storage			PCMCIA	DI/DO	Switch	OS		Wide Temp.
	RS-232	RS-232/ 422/485	10/100 Mbps	Gigabit	CF	USB	IDE		30 VDC		CE	XPE	
V462	2	2	2	–	✓	4	–	✓	–	–	✓	✓	–
V464	2	2	4	–	✓	4	–	–	–	–	✓	✓	–
V466	2	2	4	–	✓	4	–	–	–	8	✓	✓	–
V468	2	2	4	–	✓	4	–	–	8/8	–	✓	✓	–

Model Name	Serial Ports		LAN Ports		Storage					DI/DO	Display			Wide Temp.
	RS-232	RS-232/ 422/485	10/100 Mbps	10/100/ 1000 Mbps	CF	SD	USB		SATA		VGA	DVI	LVDS	
							M12	Type A						
V2101	–	2	–	2	✓	✓	–	4	–	3/3 (30 VDC)	✓	–	✓	✓
V2401	8	4	–	2	✓	–	–	4	✓	4/4 (5 VDC)	✓	✓	✓	–
V2402	–	4	–	2	✓	–	–	4	✓	4/4 (5 VDC)	✓	✓	–	–
V2406	–	4	2 (M12)	–	✓	–	1	2	✓	6/2 (30 VDC)	✓	✓	–	✓
V2422	–	4	–	2	✓	–	–	6	✓	4/4 (5 VDC)	✓	✓	–	–
V2426	–	4	2 (M12)	–	✓	–	1	2	✓	6/2 (30 VDC)	✓	✓	–	✓
V2616	–	2	2 (M12)	–	✓	–	1	2	✓	6/2 (30 VDC)	✓	✓	–	–

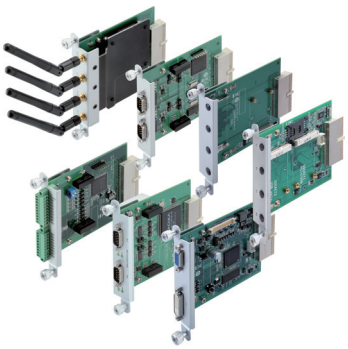
Moxa's computers are designed to operate efficiently and provide greater reliability. To achieve this, we offer EN 50155 and EN 50121 certified solutions that incorporate extensive features and functions specifically for railway applications.

Brand New Computers for AFC and Rolling Stock

Low Power Consumption

All V series computers feature sophisticated power-saving designs. For example, Moxa's V2100 and V2400 series Intel Atom computers consume less than 30 W of power, yet provide powerful performance. This combination of low power requirements and high performance is particularly helpful for industrial applications such as Automatic Fare Collection (AFC) and rolling stock.

V Series Expansion Modules



Modules	Description
EPM-3337	Wireless module with GSM, GPRS, EDGE, HSDPA, GPS, WLAN 802.11 a/b/g/n
EPM-3112	2 isolated CAN ports with DB9 connectors
EPM-3438	8 DIs and 8 DOs with 3 KV digital isolation protection, 2 KHz counter
EPM-3032	2 isolated RS-232/422/485 ports with DB9 connectors
EPM-3552	VGA and DVI-I
EPM-DK01	1 slot for mini PCI and mini PCIe expansion modules
EPM-DK02	2-slot mini PCIe expansion module

Product Spotlight

V2616

x86-based wallmount embedded computer

- High performance network video recorder for rolling stock applications
- EN 50155 certified for temperature ranges up to Class T1
- EN 50121-3-2 certified for railway applications
- IEC 61373 certified for shock and vibration resistance
- One internal SATA II storage tray for 2.5" SSD or HDD
- Two removable storage trays for 2.5" SSDs or HDDs
- Supports RAID 1/0 functions for data reliability

Rackmount Embedded Computers

IEC 61850-3 and IEEE 1613 Certified

The IEC 61850-3 and IEEE 1613 standards define the highest standard of EMI immunity and error free communication requirements for network equipment used in substations. Moxa's substation Ethernet switches and embedded computers comply with the IEC 61850-3 and IEEE 1613 standards, guaranteeing that the computers are protected against various environmental factors.

Ideal Products for Power Applications

19-inch Rackmount Installation for Easy Deployment

All DA series computers have a 19-inch rackmount design well-suited for data collection and computing in power automation applications. These computers are also ideal as front-end controllers for complicated protocol conversion applications in substation automation.

Powerful Serial and Network Communication

Multiple serial ports and network interfaces provide more options for device connections and make it easier to design a redundant system architecture. You can also easily add WLAN/cellular connections by installing the appropriate interface card in the PCMCIA slot.

Dual Power Inputs for Reliable Operation

Dual power inputs with 100-240 VAC/VDC compatibility allow DA series computers to continue operating during power interruptions.

Versatile Storage Options for Data Logging

DA series computers come with CompactFlash sockets, USB ports, and even additional hard disk expansion slots, which provide many convenient options for storage expansion and data options.

Industrial-grade Design for Stable System Operations

The industrial-grade design of DA series computers ensures reliable and stable operations for various industrial applications. The DA design does not use fans or cables, reducing the number of parts, wear and tear, and points of failure. The DA-681-I-DPP-T is even IEC 61850-3 certified, making it the optimal solution for power substation applications that require IEC 61850.

Multiple Expansion Modules for Greater Flexibility

The DA-682 and DA-710 offer two or four expansion slots that can be used with the seven available DA series expansion modules, allowing you to tailor your communications suite to your specific application. Expansion modules include 8-port RS-232/422/485 modules, 4-port 10/100 Mbps LAN modules, 8-port RS-422/485 modules, 8-port switch modules, and universal PCI expansion modules. The modules have a user-centric design that allows you to swap modules quickly and easily.

Product Spotlight

DA-683

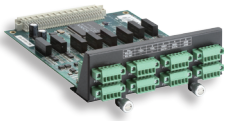
x86-based rackmount embedded computer

- Intel Dual Core Atom D510 1.66 GHz processor with 1 MB L2 cache
- 6 10/100/1000 Mbps Ethernet ports, 2 RS-232 serial ports, 4 DIs, 4 DOs
- 2 PCI expansion slots for inserting expansion modules
- IEC 61850-3 and IEEE 1613 certified (DPP-T models only)
- IEEE 1588 supported (Linux models only)

DA Series Expansion Modules

DA-SP08-DB
8 RS-232/422/485 ports with DB9 connectors

DA-SP08-I-DB
8 RS-232/422/485 ports with DB9 connectors, 2 KV isolation

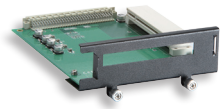


DA-SP38-I-TB
8 RS-422/485 ports, terminal block, 2 KV isolation

DA-LN04-RJ
4-port 10/100 Mbps LAN module with RJ45 connectors

DA-SW08-RJ
8-port 10/100 Mbps switch module with RJ45 connectors

DA-SP08-I-TB
8 RS-232/422/485 ports, terminal block, 2 KV isolation



DA-UPCI-DK
1-slot Universal PCI expansion adaptor

DA-FX04-MM-ST-T
4-port 100 Mbps fiber LAN module with ST connector

Model Name	Serial Ports	LAN Ports	Storage			DI/DO	OS		PCI Slot	Power		IEC 61850-3
		10/100 Mbps	SATA	CF	USB	30 VDC	XPE	Linux		Single	Dual	Certified
DA-681	RS-232: 4 (isolated) RS-485: 8 (isolated)	6	✓	✓	2	–	✓	✓	–	✓	✓	✓
DA-682	–	4 (Gigabit)	✓	✓	4	–	✓	✓	2	✓	✓	–
DA-710	RS-232:2	4 (Gigabit)	✓	✓	4	4/4	✓	✓	4	✓	✓	–
DA-683	RS-232:2	6 (Gigabit)	✓	✓	4	4/4	✓	✓	2	✓	✓	✓
DA-685	RS-232: 2 RS-485: 6	6	✓	✓	✓	–	–	–	–	✓	✓	–

Model Name	Serial Ports		Isolation	Switch	LAN		Connector				PCI
	RS–232/422/485	RS–232/485	2 KV Digital	10/100 Mbps	10/100 Mbps (RJ45)	100 Mbps (ST)	DB9	RJ–45	Terminal Block	Fiber	3.3/5 V
DA–SP08–I–DB	8	–	✓	–	–	–	✓	–	–	–	–
DA-SP08-DB	8	–	✓	–	–	–	✓	–	–	–	–
DA-SP08-I-TB	8	–	✓	–	–	–	–	–	✓	–	–
DA-SP38-I-TB	–	8	✓	–	–	–	–	–	✓	–	–
DA-SW08-RJ	–	–	–	8	–	–	–	✓	–	–	–
DA-LN04-RJ	–	–	–	–	4	–	–	✓	–	–	–
DA-UPCI-DK	–	–	–	–	–	–	–	–	–	–	✓
DA-FX04-MM-ST-T	–	–	–	–	–	✓	–	–	–	✓	–

Marine Displays and Computers

Overview

Moxa is a leading provider of computing solutions and services and has a broad product portfolio that includes industrial networking and system integration. With distributors in more than 60 countries, Moxa's time-tested product expertise and international support network now extend to developing the most up-to-date marine automation solutions. Moxa's marine displays and computers are designed specifically for the latest marine applications, and feature sophisticated designs with industrial grade components, ensuring reliable system operation for marine applications. With Moxa's marine displays and computers, you can truly make your marine visions a reality.

Compact Size and Rugged Design

With their compact size, Moxa's marine displays and computers are ideal for both indoor and outdoor industrial environments, including field sites that do not have a lot of extra space. In addition, the products' rugged design and high-quality components make them well suited to withstand the environmental hazards often present at field sites.

High Performance

With the Intel Core 2 Duo processor, Moxa's marine displays and computers can bring high performance computing to a variety of industrial applications. They can handle complicated industrial tasks such as data acquisition, data computing, and information analysis, and serve as front-end controllers to reduce the load on back-end servers.

Fan and Cable-free

The common practice of using fans and cables in a computer system increases the number of components and moving parts, which in turn makes the system less rugged and more prone to failure from basic wear and tear. Instead of using fans, Moxa selects components that generate less heat but can still maintain high system performance, making Moxa's marine displays and computers ideal for applications in extremely hot or cold environments. In addition, our cable-free design reduces EMI noise to ensure more reliable and stable operation.

ECDIS

ECDIS is a computer-based navigation information system that complies with International Maritime Organization (IMO) regulations and replaces the more traditional paper charts. An ECDIS system displays the information from Electronic Navigational Charts (ENC) and integrates positional information from the Global Positioning System (GPS) and other navigational technologies, such as radar and automatic Identification Systems (AIS). Moxa's marine displays and computers are calibrated and type-approved ECDIS products designed in full compliance with the latest IMO, IHO, and IEC standards, and fit seamlessly with the most sophisticated integrated marine bridge, ECDIS, and automation systems. Moxa is committed to delivering high quality products that exceed customer expectations, and as such we actively research thermal and optical bonding technology, color calibration, vibration proofing, and many other essential technologies.

ECDIS for Color Calibration

ECDIS type approval process

ECDIS type approved displays with color calibration go through a complex and sophisticated process to meet ECDIS requirements. In order to provide customers with a library for color calibration, the display must pass several checkpoints, including collecting RGB maximal values, collecting luminance values for RGB 8-step, and using this data to convert CIE standard colors to RGB colors. All of these steps are required to generate RGB files used by panel computers to display accurate colors in marine applications. However, each step requires the attention of experienced engineers using sophisticated tools.

What distinguishes the color calibration of Moxa's displays?

Moxa's ECDIS type approved displays have been thoroughly tested with the color calibration process, and include a reliable and fine-tuned color calibration library. Few suppliers in the current marine market can offer technology of a similar level, because doing so requires such a high level of engineering expertise and technological sophistication. With more than 24 years of experience in networking automation, Moxa can provide displays that have been carefully tuned for precise color calibration, and that fulfill the exacting ECDIS standards.

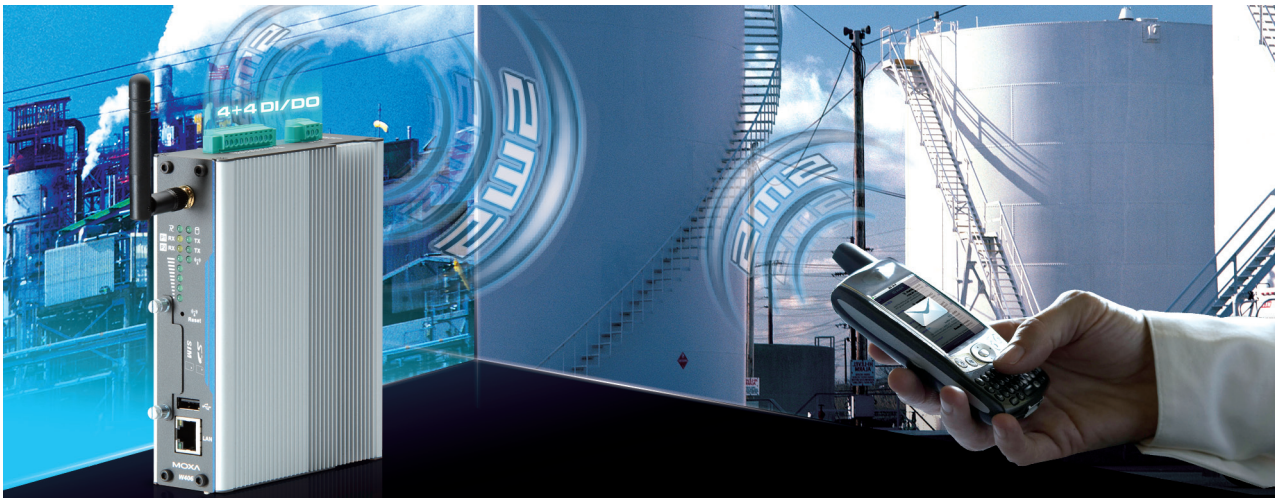
How did Moxa achieve an IP67 rating?

Achieving an IP67 rating is difficult for any type of product, but is even more difficult for a large 22-inch panel computer. An IP67-rated computer must be completely protected against contact with dust by not allowing any ingress of dust, and must be able to withstand immersion in one meter of water for up to 30 minutes. Obtaining an IP67 rating requires a total commitment to device protection design.

- Material selection: Silicon resin is an exceptionally firm adhesive, particularly since the molecular coefficient is finer and the coefficient of variation is lower than other materials.
- Adhesive dispensing process: It is very difficult to achieve a tight seal on a 22-inch screen, making the capacity and speed of adhesive dispensing a key consideration. When dispensing is inadequate, seals can fail to adhere properly, and the optical coating and color of the display can be adversely affected. To maintain consistent quality and precision, Moxa uses precision automated dispensing equipment.
- Front-side I/O waterproof design: The I/O controls on the front panel of Moxa's MPC-122-K marine panel computer are IP67-rated and include a dimming switch, OSD (on-screen display) control, and USB ports.

Model Name	Storage			Display		Panel Size	Aspect Ratio	Pixels	Contrast Ratio	Viewing Angle	Response Time	Optical Bonding	Ethernet Ports	RS-232/422/485	RS-232 Ports	NMEA Ports	PCI Slots
	Built-in	CF	HDD	VGA	DVI												
MPC-122X-K	–	✓	✓	✓	✓	22	16: 10	1680 x 1050	1000: 1	178/178	8 ms	–	2	2	–	–	–
MPC-122Y-K	–	✓	✓	✓	✓	22	16: 10	1680 x 1050	1000: 1	178/178	8 ms	✓	2	2	–	–	–
MC-4510-C23	–	✓	✓	✓	✓	–	–	–	–	–	–	–	2	2	–	–	–
MC-5150-DC-CP	✓	–	✓	✓	✓	–	–	–	–	–	–	–	2	2	2	–	–
MC-5150-AC/DC	✓	–	✓	✓	✓	–	–	–	–	–	–	–	2	2	2	12	–
MC-5157-AC/DC	✓	–	✓	✓	✓	–	–	–	–	–	–	–	2	2	2	12	2
MD-124	–	–	–	✓	✓	24	16:9	1920 x 1080	5000: 1	178/178	25 ms	–	–	–	–	–	–

Wireless Embedded Computers



WLAN Solution for Short-range Communication

802.11a/b/g

The embedded 802.11a/b/g module provides a stable wireless network connection and reliable communication, enabling Moxa's wireless computers to be used as control units for short-range communication.

Dual Network Mode

The W311/W321/W341 embedded computers support Infrastructure Mode and Ad-hoc Mode for added flexibility when constructing a wireless architecture.

Full Encryption for Data Transmission Security

The WEP, WPA, and WPA2 designs provide safe and reliable wireless communication and data acquisition for remote devices.

Repeater Function

The W311/W321/W341 computers can be used as a repeater to relay communications from wireless embedded computers, providing a cost-effective solution when building a WLAN architecture for industrial applications.

W311/321/341

W315A/325A

Cellular Solution for Long-range Communication

Quad Band GSM/GPRS/EDGE Service

When used with the embedded GSM/GPRS 900/1800/850/1900 MHz module, the W315A/W325A/W406 computers provide long-range communication that is suitable for industrial applications where wired and wireless LAN services are impossible or extremely costly.

Stable and Reliable Wireless Communication

Support for GPRS multi-slot Class 10 and GPRS mobile station Class B standards allows these wireless computers to offer quick and reliable wireless communication for any industrial M2M application.

Model Name	Serial Ports	WLAN	Cellular	LAN Ports	DI/DO	Storage		OS	
	RS-232/422/485	802.11 a/b/g	850/900/1800/1900 MGz	10/100 Mbps		SD	USB	Linux	CE
W311	1	✓	–	1	–		–	–	–
W321	2	✓	–	1	–		–	–	–
W341	4	✓	–	1	1 x Relay Output		2	–	–
W315A	1	–	GSM/GPRS	1	–		–	–	–
W325A	2	–	GSM/GPRS	1	–		–	–	–
W406	2	–	GSM/GPRS/EDGE	1	4 (30 VDC)		1	–	–

RISC-based Wallmount Embedded Computers

Overview

UC series computers include multiple connection options for data communication, such as serial ports, PCMCIA, SD, DI/DO, and USB hosts. These products work well as front-end controllers for demanding applications, including data acquisition, data computing, and protocol conversion.

RISC-based Processor for Optimal Solutions

UC Series computers use RISC-based processors to offer the most cost-effective solutions for building a variety of industrial applications.

Model Name	Serial Ports	CAN Ports		LAN Ports	Storage		DI/DO	Switch Ports	OS		Wide Temp.
	RS-232/422/485	Ports	Optical Isolation	10/100 Mbps	CF	USB Ports	30 VDC		CE	Linux	
UC-7410 Plus	8	–	–	2	✓	1.1: 1	8/8	–	–	✓	✓
UC-8410	8	–	–	3	✓	2	4/4	–	✓	✓	✓
UC-8416	8	–	–	3	✓	2	4/4	8	✓	✓	✓
UC-8418	8	2	2 KV	3	✓	2	12/12	–	✓	✓	✓
UC-8430	8	–	–	3	✓	6	4/4	–	✓	✓	✓
UC-8481	2	–	–	2	✓	2	4/4	–	–	✓	✓

Model Name	Serial Ports	LAN Ports	Storage		OS			Wide Temp.
	RS-232/422/485	10/100 Mbps	SD	USB Ports	CE	Linux	µClinux	
UC-7101	1	1	✓	–	–	✓	✓	✓
UC-7110	2	2	–	–	–	✓	✓	✓
UC-7112	2	2	✓	–	✓	✓	✓	–
UC-7122	2	2	✓	1	–	–	✓	✓
UC-7124	4	2	✓	1	–	–	✓	✓

Product Spotlight

UC-8481

RISC-based wallmount embedded computer

- Intel XScale IXP435 533 MHz processor
- 2 10/100 Mbps Ethernet ports
- 2 RS-232/422/485 serial ports
- Wireless and GPS modules for multiple communications
- Ready-to-run Embedded Linux
- -40 to 70°C wide temperature model available

DIN-Rail Embedded Computers

Rugged and DIN-Rail Mountable for Easy Installation

IA series systems are all designed with a rugged vertical DIN-Rail form factor. The computers are easy to install in small cabinets and provide a cost effective solution for industrial automation applications such as manufacturing automation and mining.

Ideal for Harsh Environments

Wide operating temperature models of the IA series feature a -40 to 75°C operating temperature range, and can serve as reliable solutions for harsh industrial automation environments.

Model Name	Serial Ports	CAN	LAN Ports	PCMCIA	Storage			DI/DO	VGA	OS		Wide Temp.
	RS-232/422/485	Ports	10/100 Mbps		CF	SD	USB Ports			CE	Linux	
IA240	4	–	2	–	–	✓	1	4/4 (5 VDC)	–	–	✓	✓
IA241	4	–	2	✓	–	✓	1	4/4 (5 VDC)	–	–	✓	✓
IA260	4	–	2	–	✓	✓	2	8/8 (30 VDC)	✓	✓	✓	✓
IA261-I	4	–	2	–	✓	–	2	8/8 (30 VDC)	✓	✓	✓	✓
IA262-I	2	2	2	–	✓	–	2	8/8 (30 VDC)	✓	✓	✓	✓

Product Spotlight

IA3341 Series

- Moxa ART 32-bit ARM 9 industrial processor
- 64 MB RAM, 16 MB Flash onboard
- 2 software selectable RS-232/422/485 serial ports
- 50 bps to 921.6 Kbps serial speed
- 4 DIs and 4 DOs with 3 KV digital isolation protection
- 2 AIs and 2 thermocouple inputs
- Supports Modbus TCP server to provide AI and thermocouple data
- Provides TCP client library in C for Windows platforms

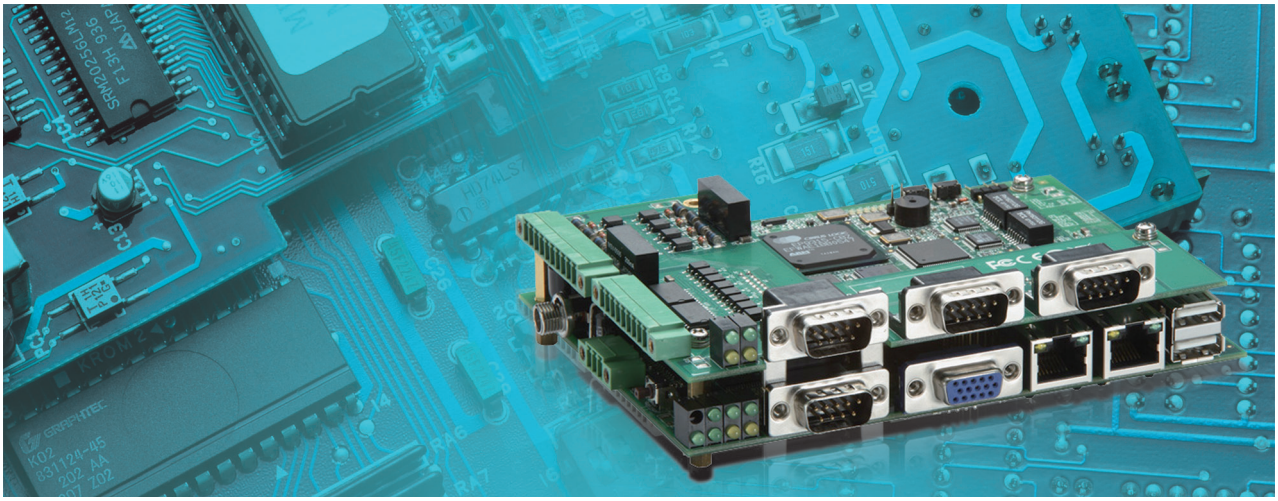
IA260 Series

- Patented “H-Type” heat dissipation
- 4 RS-232/422/485 serial ports, 8+8 DI/DO channels, up to 30 VDC
- VGA interface for field site monitoring

IA261-I/262-I Series

- 8+8 DI/DO with 3 KV optical isolation and 20 V output
- 2 KV optically isolated RS-232/422/485 serial ports
- CANbus and CANopen protocols supported

Modular Embedded Computers



Reduce Your Time to Market

Moxa's embedded modules are available with the µClinux operating system pre-installed to help you minimize your system development time. In addition, the compact, all-in-one design provides all the components you need—CPU, RAM, Flash, and even more complex components such as OS kernel, drivers, and middleware—to get your products to market in less time.

Easy-to-use Development Kit

The embedded module development kit is an invaluable tool for testing and evaluating Moxa's embedded modules. The kit can be ordered separately, and includes an embedded module, embedded module carrier board, relevant documents, a software CD, and the items needed to set up a basic layout. The kit makes it easy for users to evaluate the functionality of the embedded modules. Use the development kit to develop and integrate your specific hardware in advance to guarantee that the embedded modules fit seamlessly into your industrial systems and applications.

Model Name	Serial Ports	LAN Ports	GPIO	Storage			OS			Wide Temp.
	RS-232/422/485	10/100 Mbps		CF	SD	USB	CE	Linux	uClinux	
EM-1220	2	2	10	–	✓	–	–	–	✓	✓
EM-1240	4	2	10	–	✓	–	–	–	✓	✓
EM-2260	4	2	8 DIs, 8 DOs	✓	–	–	✓	✓	–	–

Product Spotlight

EM-1220/1240 Series

- MOXA ART ARM9 32-bit 192 MHz processor
- 16 MB RAM, 8 MB flash disk on-board
- 2 RS-232/422/485 serial ports (EM-1220 model)
- 4 RS-232/422/485 serial ports (EM-1240 model)
- Dual 10/100 Mbps Ethernet and SD socket
- Ready-to-run µClinux Kernel 2.6 platform
- Built-in RTC, buzzer
- 10 GPIOs reserved for system integration
- Full-function development kit for quick evaluation and application development
- -40 to 75°C wide temperature model available

EM-2260 Series

- Cirrus Logic EP9315 ARM9 CPU, 200 MHz
- 128 MB RAM on-board, 32 MB flash disk
- Graphical interface for connecting external VGA devices
- 2 KV optically isolated RS-232/422/485 serial ports
- Dual 10/100 Mbps Ethernet for network redundancy
- 8 DI and 8 DO channels
- Supports CompactFlash and USB 2.0 hosts
- Ready-to-run WinCE 6.0 or Linux platform
- Full-function development kit for quick evaluation and application development

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